AMENDMENTS TO THE CLAIMS

1. (Previously presented) A method of forming silver selenide on a substrate, said method comprising:

providing a silver selenide sputter target in a sputter deposition chamber;

introducing a sputter gas into said chamber;

conducting a sputtering process on said target to produce a deposited silver selenide film on said substrate; and

maintaining said silver selenide target at a temperature of less than about 350°C during said sputtering process to form a silver selenide film which comprises both alpha silver selenide and beta silver selenide.

2. (Original) The method of claim 1, wherein said silver selenide target temperature is maintained at less than about 250°C during said sputtering process.

3. (Original) The method of claim 1, wherein maintaining the silver selenide target temperature of less than about 350°C is achieved by maintaining a sputter power of less than about 200 W during sputtering.

4. (Original) The method of claim 1, wherein maintaining the silver selenide target temperature of less than about 350°C is achieved by maintaining an effective sputter power density of less than about 1 W/cm^2.

5. (Original) The method of claim 1, wherein maintaining the silver selenide target temperature of less than about 350°C is achieved by maintaining a sputter gas pressure of less than about 40 mTorr.

6. (Original) The method of claim 5, wherein maintaining the silver selenide target temperature of less than about 350°C is achieved by maintaining a sputter gas pressure of less than about 10 mTorr.

7. (Original) The method of claim 1, wherein said step of maintaining a silver selenide target temperature of less than about 350°C is achieved by using a sputter gas having a molecular weight at least greater than the molecular weigh of neon.

8. (Original) The method of claim 1, wherein maintaining the silver selenide target temperature of less than about 350°C is achieved by positioning a magnetron a distance from the target so as to maintain a target temperature of less than about 350°C.

9. (Original) The method of claim 1, wherein maintaining the silver selenide target temperature of less than about 350°C is performed by cooling said silver selenide sputter target with a cooling apparatus.

10. (Original) The method of claim 1, wherein said sputter process is a pulsed DC sputter deposition process.

11. (Original) The method of claim 1, wherein said sputter process is a DC sputter deposition process.

12. (Original) The method of claim 1, wherein said sputter process is a RF sputter deposition process.

13. (Previously presented) A method of forming silver selenide on a substrate, said method comprising:

providing a silver selenide sputter target in a sputter deposition chamber;

introducing a sputter gas into said chamber;

conducting a sputtering process on said target to produce a deposited silver selenide film on a substrate; and

maintaining a sputter power such that said silver selenide target is maintained at a temperature of less than about 350°C during said sputtering process to form a silver selenide film which comprises both alpha silver selenide and beta silver selenide.

14. (Original) The method of claim 13, further comprising the step of maintaining a sputter power such that said silver selenide target is maintained at a temperature of less than about 250°C during said sputtering process.

15. (Original) The method of claim 13, wherein said sputter power is less than about 200 W.

16. (Original) The method of claim 15, wherein said sputter power is less than about 100 W.

17. (Previously presented) A method of forming silver selenide on a substrate, said method comprising:

providing a silver selenide sputter target in a sputter deposition chamber;

introducing a sputter gas into said chamber;

conducting a sputtering process on said target to produce a deposited silver selenide film on a substrate; and

maintaining an effective sputter power density of less than about 1 W/cm^2 on said target to form a silver selenide film which comprises both alpha silver selenide and beta silver selenide.

18. (Original) The method of claim 17, wherein maintaining the effective sputter power density of less than about 1 W/cm^2 causes said silver selenide target to be maintained at a temperature of less than about 350°C.

19. (Original) The method of claim 17, wherein maintaining the effective sputter power density of less than about 1 W/cm^2 causes said silver selenide target to be maintained at a temperature of less than about 250°C.

20. (Original) The method of claim 17, wherein said power density is determined by measuring a sputter profile area on the target and dividing said sputter profile area by a sputter power of said sputtering process.

21. (Original) The method of claim 20, wherein said sputter profile area is non-uniform.

22. (Previously presented) The method of claim 21, wherein said sputter profile area is determined by measuring a racetrack area of the sputter target.

23. (Original) The method of claim 20, wherein said sputter profile area is uniform.

24. (Original) The method of claim 23, wherein said sputter profile area is the total target area.

25. (Previously presented) A method of forming silver selenide on a substrate, said method comprising:

providing a silver selenide sputter target in a sputter deposition chamber;

introducing a sputter gas into said chamber;

conducting a sputter process on said target to produce a deposited silver selenide film on a substrate; and

maintaining a sputter gas pressure of less than about 40 mTorr in said chamber to form a silver selenide film which comprises both alpha silver selenide and beta silver selenide.

26. (Original) The method of claim 25, wherein said step of maintaining a sputter gas pressure less than about 40 mTorr causes said silver selenide target to be maintained at a temperature of less than about 350°C.

27. (Original) The method of claim 25, wherein said step of maintaining a sputter gas pressure less than about 40 mTorr causes said silver selenide target to be maintained at a temperature of less than about 250°C.

28. (Previously presented) A method of forming silver selenide on a substrate, said method comprising:

providing a silver selenide sputter target in a sputter deposition chamber;

introducing a sputter gas into said chamber;

conducting a sputtering process on said target to produce a deposited silver selenide film on a substrate; and

maintaining a sputter gas pressure of less than about 10 mTorr to form a silver selenide film which comprises both alpha silver selenide and beta silver selenide.

29. (Original) The method of claim 28, wherein said step of maintaining a sputter gas pressure of less than about 10 mTorr causes said silver selenide target to be maintained at a temperature of less than about 350°C.

30. (Original) The method of claim 29, wherein said step of maintaining a sputter gas pressure of less than about 10 mTorr causes said silver selenide target to be maintained at a temperature of less than about 250°C.

31. (Previously presented) A method of forming silver selenide on a substrate, said method comprising:

providing a silver selenide sputter target in a sputter deposition chamber;

introducing a sputter gas having a molecular weight greater than a molecular weight of neon into said chamber;

conducting a sputtering process on said target to produce a deposited silver selenide film on a substrate; and

controlling the temperature of the substrate such that the silver selenide film comprises both alpha silver selenide and beta silver selenide.

32. (Original) The method of claim 31, wherein said sputter gas is argon, xenon, or a combination of argon and xenon.

33. (Original) The method of claim 32, wherein said sputter gas is xenon.

34. (Previously presented) A method of forming silver selenide on a substrate, said method comprising:

providing a silver selenide sputter target in a sputter deposition chamber;

introducing a sputter gas into said chamber;

conducting a sputtering process on said target to produce a deposited silver selenide film on a substrate; and

providing a cooling apparatus capable of maintaining said silver selenide target at a temperature of less than about 350°C during said sputtering process to form a silver selenide film which comprises both alpha silver selenide and beta silver selenide.

35. (Original) The method of claim 34, wherein said cooling apparatus is capable of maintaining said target at a temperature of less than about 250°C during sputtering.

36. (Original) The method of claim 34, further comprising the step of providing a target backing plate attached to and in thermodynamic contact with said silver selenide target.

37. (Original) The method of claim 36, wherein said sputter target cooling apparatus is a cooling chamber.

38. (Original) The method of claim 37, wherein said cooling chamber allows a cooling fluid to flow across said target backing plate.

39. (Original) The method of claim 38, wherein said cooling fluid flows at a rate greater than about 2.5 gallons per minute.

40. (Original) The method of claim 38, wherein said cooling fluid temperature is less than about 25°C.

41. (Original) The method of claim 35, wherein thermal conductivity between said cooling apparatus and said target material is maximized.

42. (Original) The method of claim 36, wherein said target backing plate is colored black.

43. (Previously presented) A method of forming silver selenide on a substrate, said method comprising:

placing a silver selenide sputter target into a sputter deposition chamber;

injecting a sputter gas into said chamber;

conducting a sputtering process on said target to produce a deposited silver selenide film on a substrate; and

spacing a magnetron a distance from said target so as to maintain a target temperature of less than about 350°C to form a silver selenide film which comprises both alpha silver selenide and beta silver selenide.

44. (Original) The method of claim 43, wherein said magnetron is spaced a distance from the said target so as to maintain a target temperature of less than about 250°C.

45. (Previously presented) A method of controlling defect formation during silver selenide deposition comprising:

providing a silver selenide sputter target in a sputter deposition chamber;

injecting a sputter gas having a molecular weight greater than a molecular weight of neon into said sputter deposition chamber;

conducting a sputtering process on said target to produce a deposited silver selenide film on a substrate; and

maintaining a pressure of said sputter gas of less than about 10 mTorr such that said sputter target temperature is maintained at less than about 350°C to form a silver selenide film which comprises both alpha silver selenide and beta silver selenide.

46. (Original) The method of claim 45, wherein said sputter gas is xenon, argon, or a mixture of xenon and argon.

47. (Original) The method of claim 46, wherein said sputter gas is xenon.

48. (Original) The method of claim 45, wherein a pressure of said sputter gas is maintained at less than about 10 mTorr such that said silver selenide target temperature is maintained at less than about 250°C.

49. (Original) The method of claim 45, further comprising cooling said silver selenide sputter target with a cooling apparatus.

50. (Previously presented) A method of forming a defect free silver selenide film comprising the steps of:

providing a silver selenide target;

conducting a sputtering process on said target so as to form a defect free silver selenide film on a substrate; and

controlling the temperature of the substrate such that the silver selenide film comprises both alpha silver selenide and beta silver selenide.

51. (Original) The method of claim 50, wherein said defect free silver selenide film contains less than about 0.16 defect counts/cm^2.

52. (Original) The method of claim 50, wherein said step of conducting a sputtering process on said target further comprises the step of maintaining said silver selenide target at a temperature of less than about 350°C during said sputtering process.

53. (Original) The method of claim 52, wherein said silver selenide target is maintained at a temperature of less than about 350°C during sputtering by maintaining a sputter power such that said target temperature is maintained at less than about 350°C.

54. (Original) The method of claim 52, wherein said silver selenide target is maintained at a temperature of less than about 350°C during sputtering by maintaining an effective sputter power density on said target of less than about 1 W/cm^2.

55. (Original) The method of claim 52, wherein said silver selenide target is maintained at a temperature of less than about 350°C during sputtering by maintaining a sputter gas pressure of less than about 40 mTorr.

56. (Original) The method of claim 55, wherein said silver selenide target is maintained at a temperature of less than about 350°C during sputtering by maintaining a sputter gas pressure of less than about 10 mTorr.

57. (Original) The method of claim 52, wherein said silver selenide target is maintained at a temperature of less than about 350°C during sputtering by providing a sputter gas having a molecular weight at least greater than the molecular weigh of neon.

58. (Original) The method of claim 52, wherein said silver selenide target is maintained at a temperature of less than about 350°C during sputtering by positioning a magnetron a distance from the target so as to maintain a target temperature of less than about 350°C.

59. (Original) The method of claim 52, wherein said silver selenide target is maintained at a temperature of less than about 350°C during sputtering by cooling said silver selenide sputter target with a cooling apparatus.

60. (Previously presented) A sputter deposition apparatus for conducting silver selenide deposition, comprising:

a chamber having a vacuum enclosure;

a silver selenide sputter target maintained at a temperature of less than about 350°C during sputtering; and

a substrate table for maintaining a temperature of a substrate such that a silver selenide film formed on the substrate comprises both alpha silver selenide and beta silver selenide.

61. (Original) The apparatus of claim 60, further comprising a cooling apparatus capable of maintaining said silver selenide sputter target at a temperature of less than about 350°C during sputtering.

62. (Original) The apparatus of claim 60, further comprising a target backing plate attached to and in thermodynamic contact with said silver selenide sputter target.

63. (Previously presented) The apparatus of claim 61, wherein said sputter target cooling apparatus is a cooling chamber.

64. (Original) The apparatus of claim 63, wherein said cooling chamber allows a cooling fluid to flow across said target backing plate.

65. (Original) The apparatus of claim 64, wherein said cooling fluid flows at a rate greater than about 2.5 gallons per minute.

66. (Original) The apparatus of claim 64, wherein said cooling fluid temperature is less than about 25°C.

67. (Original) The apparatus of claim 61, wherein thermal conductivity between said cooling apparatus and said target material is maximized.

68. (Original) The apparatus of claim 62, wherein said target backing plate is colored black.

69. (Original) The apparatus of claim 60, further comprising a magnetron.

70. (Original) The apparatus of claim 69, wherein said magnetron is positioned such that said silver selenide target temperature is maintained at less than about 350°C during sputtering.

71. (Original) The apparatus of claim 69, wherein said magnetron is positioned such that said silver selenide target temperature is maintained at less than about 250°C during sputtering.

72. (Original) The apparatus of claim 60, further comprising a sputter gas maintained at a pressure of less than about 40 mTorr.

73. (Original) The apparatus of claim 72, wherein said sputter deposition gas has a molecular weight greater than a molecular weight of neon.

74. (Original) The apparatus of claim 73, wherein said sputter deposition gas is xenon, argon, or a mixture of xenon and argon.

75. (Original) The apparatus of claim 74, wherein said sputter deposition gas is xenon.

76. (Original) The apparatus of claim 60, further comprising a sputter gas maintained at a pressure of less than about 10 mTorr.

77. (Original) A method of forming silver selenide on a substrate, said method comprising:

providing a silver selenide sputter target in a sputter deposition chamber;

providing a substrate in said chamber;

introducing a sputter gas into said chamber;

conducting a sputtering process on said target, wherein a sputter power and a sputter pressure are adjusted so as to produce a deposited silver selenide film comprising both alpha silver selenide and beta silver selenide.

78. (Original) The method of claim 77, further comprising maintaining a temperature of said substrate such that the fraction of alpha silver selenide in said deposited silver selenide film is increased.

79. (Currently amended) The method of claim 78, wherein said substrate is maintained at a temperature of greater than about 30°C such that said deposited silver selenide film comprises both alpha silver selenide and beta silver selenide.

80. (Original) The method of claim 77, wherein said sputter process comprises maintaining a sputter pressure of at least about 10 mTorr and maintaining a sputter power of less than about 250W.

81. (Original) A method of forming a defect free silver selenide film, comprising:

providing a silver selenide sputter target in a sputter deposition chamber;

providing a substrate in said chamber;

introducing a sputter gas into said chamber;

conducting a sputtering process on said target, wherein a sputter power and a sputter pressure are adjusted so as to produce a deposited silver selenide film comprising both alpha silver selenide and beta silver selenide; and

maintaining said silver selenide target at a temperature of less than about 350°C during said sputtering process;

82. (Original) The method of claim 81, further comprising maintaining a temperature of said substrate such that the fraction of alpha silver selenide in said deposited silver selenide film is increased.

83. (Currently amended) The method of claim 82, wherein said substrate is maintained at a temperature of greater than about 30°C such that said deposited silver selenide film comprises both alpha silver selenide and beta silver selenide.

84. (Original) The method of claim 81, wherein said sputter process comprises maintaining a sputter pressure of at least about 10 mTorr and maintaining a sputter power of less than about 250W.

85-86. (Canceled).

87. (New) The method of claim 1, further comprising maintaining said substrate at a temperature of greater than about 25°C such that said deposited silver selenide film comprises both alpha silver selenide and beta silver selenide.

88. (New) The method of claim 13, further comprising maintaining said substrate at a temperature of about 25°C such that said deposited silver selenide film comprises both alpha silver selenide and beta silver selenide.

89. (New) The method of claim 17, further comprising maintaining said substrate at a temperature of about 30°C such that said deposited silver selenide film comprises both alpha silver selenide and beta silver selenide.

90. (New) The method of claim 31, wherein the temperature of said substrate is maintained at a temperature of greater than about 25°C such that said deposited silver selenide film comprises both alpha silver selenide and beta silver selenide.

91. (New) The method of claim 60, wherein the substrate table is configured to maintain said substrate at a temperature of greater than about 25°C such that said deposited silver selenide film comprises both alpha silver selenide and beta silver selenide.